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ABSTRACT

This study used species diversity indices developed in ecology as a measure of socioethnic diversity, and compared them to Coleman's Index of Segregation. The twelve indices were Simpson's Concentration Index ("ell"), Simpson's Index of Diversity, Hurlbert's Probability of Interspecific Encounter (PIE), Simpson's Probability of Individual Interspecific Encounter, the complement to Simpson's Concentration Index (1-"ell"), McIntosh's Index, the Shannon-Weiner Diversity Index, Number of Species (and its complement), and Importance Values (relative importance, unrelative importance, and equitability). Intercorrelation matrices were formed for racial and ethnic segregation and diversity measures. Coleman's segregation index and its expected value do not correlate strongly with each other or any of the diversity measures. Correlations approaching unity do exist between many of the racial and ethnic diversity measures. The indices using evenness, equitability, and importance of racial and ethnic characteristics to measure similarity-dissimilarity were the most effective measures of racial and ethnic diversity of schools. All the measures except Coleman's index showed public schools to be more racially and ethnically diverse than private schools. (BW)

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Measures of School Integration: Comparing Coleman's Index to Measures of Species Diversity

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In a highly publicized study, Coleman, Hoffman and Kilgore (1981) concluded that public schools were "less effective" than either Catholic or private schools. Indeed, they claimed that private schools were slightly less segregated than public schools. This latter finding seems to fly in the face of minute minority, and particularly black, enrollments in private schools. Such an interpretation calls for a close inspection of their methodology and their choice of an index to measure segregation. Additionally, their interpretation brings into focus the controversy regarding measures of segregation.

The responsibility of school systems in the United States to provide quality education to all students underscores the need to develop unambiguous measures of integration. A review of the educational literature reveals a collage of definitions and methods used to describe integration. Taeuben and Taeuben (1969) provided a detailed analysis of segregation indices. The Index of Dissimilarity presented by Duncan and Duncan (1955) became the most popular measure of segregation. This index uses the Lorenz curve to measure the unevenness of distribution of two groups. Dissimilarity indices are affected by the size of the analysis unit and the group composition of the aggregate (Cortese, Falk and Cohen, 1976). This affect can cause and observed dissimilarity index value to be misinterpreted. Based on information theory Theil and Finizza (1971) developed an index that measures race entrophy, a measure of the contribution a school district's racial composition

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makes to segregation throughout the whole system (Zoloth, 1976). The difficulty with this measurement is that the results do not provide easy direct interpretation. Coleman (1981) describes his index of segregation as a "variance" measure. Page (1981) criticizes this index with favoring the private sector by emphasizing the within-sector variance and suggests an "Index of Integration".

Ecologists use the concept of species number, richness, equitability or evenness, and importance to measure similarity-dissimilarity in biological communities. Peet (1975) provides a review of species diversity concepts regarding species number and distribution. Similar concepts appear in several biological, physical and social sciences (Patil and Taille, 1982). Whether measuring segregation of schools or species diversity of biological communities it is difficult to understand the complex phenomena that affect diversity. This has led to various interpretations of the diversity concept. As a result, diversity is largely defined by the instrument used to measure it. The lack of universal agreement on the concept of diversity prevents the scientific community from clarifying controversial issues for the public.

This study uses species diversity indices developed in ecology as a measure of socioethnic diversity, comparing these to Coleman's Index of Segregation.

Coleman's Index

Coleman, Kelly and Moore (1975) measure between-school-sector segregation as a function of interacial contact and measures within-school-sector segregation by standardizing the interacial contact. The measure of interacial contact (S_{ij}) is a measure of the average proportion of a

student's schoolmates who are from another group. It is constructed as follows for any groups i and j:

$$S_{ij} = \frac{\Sigma n \; P}{\Sigma_k \; n_{ki}}, \text{ where}$$

n_{ki} = number of students in group i in school k

P_{kj} = proportion of students in group i in school k

Schools in the sector are numbered 1, ... k, ... n.

Segregation (r_{ij}) within a sector is constructed by standardizing the measure of interacial contact by the proportion of students of the other group in the sector:

$$r_{ij} = \frac{P_j - S_{ij}}{P_j}, \text{ where} \qquad (1)$$

P_j = proportion of students in group j.

The measure of interacial contact (S_{ij}) is affected by the degree of segregation between groups of students in the sector and by the overall proportion of each group of students. The segregation index (r_{ij}) is affected by the distribution of students among the schools within a sector. Coleman (1981) concluded public schools have higher proportions of blacks and are less interacially segregated than private schools but are more internally segregated within the sector than private schools. The lesser degree of segregation within the private sector counteracts the higher degree of interacial contact and overall private schools contribute slightly less to segregation. Coleman concluded that these two tendencies would cancel each other out if the private school students were absorbed into public schools with exactly the same distribution among schools that is currently found in public schools.

Expected Value of r_{ij}

Researchers have demonstrated that Coleman's index is not a function of the proportion of the universe population in a group (Becker, McPortland, and Thomas 1978). Becker et al. demonstrated the expected value of r_{ij} is equal to m/N, where m is the number of units in the universe and N is the total population in the universe. For a universe of equal size $E[r_{ij}]=1/n$, where n = N/m. This study uses this relationship to measure the effect a school population has on $E[r_{ij}]$.

$$E[S] = 1/n = M_j/N_{ij}, \text{ where} \qquad (2)$$

M_j = total schools in type j

N_{ij} = total students in school i, type j.

Socioethnic Diversity Measures

This study uses 12 measures of socioethnic diversity derived from species diversity used in ecology. A brief presentation of the equation are given here; for a review of these indices see Peet (1975).

Simpson's ℓ

Simpson (1949) interpreted ℓ as the probability that two individuals chosen at random and independently from a population will belong to the same group. He considered an infinite population such that each individual belongs on one of z groups, let $\pi_1, \ldots \pi_z$ ($\Sigma\pi = 1$) be the proportions of individuals in the various groups.

Given a sample of N individuals chosen at random from a population, let $n_1, n_2 \ldots n_z$ ($\Sigma n = N$) be the number of individuals in different groups. The combined estimator of ℓ is given as:

$$D_1 = \ell = \Sigma \frac{n(n-1)}{N(N-1)}; \qquad (3)$$

since 1/2 N(N-1) is the number of pairs in the sample and 1/2 $\Sigma n(n-1)$ is the number of pairs drawn from the same groups.

This index is inversely proportional to diversity. For a community consisting of one group with nine individuals and a second group with one individual the index would be .8. For a community with two groups each having five individuals the index would equal .44. Simpson calls this statistic a measurement of concentration and treats it synonymously with diversity.

Simpson's Index of Diversity

Cox (1976) referred to Simpson's index as corresponding to the number of randomly selected pairs of individuals that must be drawn from a community in order to have an even chance of obtaining a pair with both individuals of the same species. This index is calculated by the following equation:

$$D_2 = \Sigma \frac{N(N-1)}{n(n-1)}. \qquad (4)$$

This index is proportional to diversity. A careful inspection shows that $D_2 = 1/D_1$. For a community of two groups containing nine and one individuals the index would equal 1.25. A community of two groups each containing five individuals would equal 2.25. This index can have values between one and infinity.

Hurlbert's Probability of Interspecific Encounter (PIE)

Hurlbert (1971) criticized ecologists for advancing the diversity concept into a nonconcept unrelated to meaningful biological properties. He proposed ecologists develop meaningful biological properties using species composition parameters; the probability of interspecific encounter

(PIE), a measure of an individual moving at random in a community was devised by Hurlbert. A community will have (N) (N-1)/2 potential encounters of N individuals; $\Sigma(n)(N-n)/2$ would involve individuals belonging to different groups.

$$D_3 = PIE = \Sigma\left(\frac{n}{N}\right)\left(\frac{N-n}{N-1}\right) = \left(\frac{N}{N-1}\right)(1-\Sigma\pi^2), \text{ where} \qquad (5)$$
$$\pi = \frac{n}{N}.$$

Simpson's $1 - \Sigma\pi^2$

Hurlbert (1971) referred to $D_4 = 1 - \Sigma\pi^2$ (6)
as a compliment of Simpson's index. This measures the probability of individual interspecific encounter.

Simpson's $1 - \ell$

The compliment of ℓ is considered:

$$D_5 = 1 - D_1 \qquad (7)$$

The relationship of D_5 to D_4 and PIE is due to the direct relationship of ℓ to $\Sigma\pi^2$, which is $1 - \ell = (n/N)\Sigma(\frac{n}{N})^2$.

Consider $D_5 = 1 - D_1$:

$1 - \ell = 1 - [\Sigma n(n-1)/N(N-1)]$;

$1 - \ell = [N(N-1) - \Sigma n(n-1)]/N(N-1)$;

$1 - \ell = [N^2 - N - \Sigma n^2 + \Sigma n]/N(N-1)$;

$1 - \ell = [N^2 - N - \Sigma n^2 + N]/N(N-1)$;

$1 - \ell = [N^2 - \Sigma n^2]/N(N-1)$;

$1 - \ell = N/N-1 \cdot [1 - (\Sigma n^2/N^2)]$;

$1 - \ell = N/N-1 \cdot (1 - \Sigma\pi^2)$;

This last expression is identical to D_3, Hurlbert's measure of PIE.

McIntosh's Index

McIntosh (1967) proposed a variation of Simpson's index that is derived

from a distance measure. This index is given by:

$$D_6 = (N - \sqrt{\Sigma n^2})/(N - \sqrt{N}) \qquad (8)$$

Distance is a measure of the ecological relationship suggested by the similarity of two communities or samples. Two communities in which three groups are represented appear as points in a three-dimensional space. The equation is valid beyond three dimensions in an n-dimensional space. Each group is theoretically represented by an axis in such a hypothetical space. The similarity of a set of communities is represented by the matrix of distance values between the communities.

Shannon-Weiner Diversity Index

The Shannon-Weiner Index uses information about the degree of uncertainty in choosing the group membership of an individual drawn at random (Shannon and Weaver, 1949). The uncertainty increases both as the number of groups increases and as the individuals are distributed more equitably among the group already present. The index is given by:

$$D_7 = -\Sigma \left(\frac{n}{N}\right) \log \left(\frac{n}{N}\right). \qquad (9)$$

Number of Species

Species number is a fundamental concept of diversity used to define the functional relation of species-abundance to estimate species richness and equitability of a community. Monk (1967) used a second degree polynominal to show a strong relation between the Shannon-Weiner Index and number of species. This study used $D_7 = S$, where S = the number of groups (groups are analogous to species) and $D_8 = 1 - \frac{1}{S}$ as a measure of diversity. (11)

Importance Values

Whittaker (1972) examined diversity patterns based on the slope of

the dominance diversity curves or importance value sequence. The curves are constructed such that the ordinate represents the logarithm of some importance value (e.g. abundance) while the abscissa is simply the included species sequence from most to least important (Peet, 1974). Equitability may be conceived as a function of the variance of species importance values: the wider the dispersion of the importance values, the lower the equitability. Three measures of importance (relative importance, unrelative importance and equitability) are the final measures used in this study. Using Whittaker's (1972) notation the variance for relative importance values is related to Simpson's index, $V_e = C - 1/S$, where C was the notation used by Whittaker for Simpson's ℓ.

$$D_{10} = \ell - 1/S, \text{ measures relative importance} \quad (12)$$

$$D_{11} = \frac{\Sigma n^2 - (N^2/S)}{(1-1/S)(N-S)}2, \text{ measures unrelative importance} \quad (13)$$

$$D_{12} = 1 - D_{11}, \text{ measures equitability} \quad (14)$$

Date Set Used

The data collected in 1980 by the National Opinion Research Center at the University of Chicago for the National Center for Educational Statistics served as the data base for this study. An auxiliary data set was generated using the school as the unit of analysis and card images were built by school for number of students by race or ethnic group. From this set another data set was generated with card images containing school ID, school type, and the calculated values of the 14 indices by race and ethnic origin.

Methods

A factor analysis for both racial and ethnicity were completed and intercorrelation matrices were formed. ANOVA's by schooltype were completed.

Results

Intercorrelation matrices were formed for racial and ethnic segregation and diversity measures (Table 1). Coleman's segregation index and E[S] do not correlate strongly with each other or any of the racial or ethnic diversity measures. Correlations approaching unity do exist between many of the race and ethnic diversity measures. Racial diversity measures: Simpson's (D_1), Simpson's Index of Diversity (D_2), PIE (D_3), Simpson's $1-\Sigma TT^2$ (D_4), Simpson's $1-\ell$ (D_5), McIntosh's Index (D_6), and Shannon-Weiner's Diversity Index (D_7) all correlate strongly, the lowest absolute correlation value of this set being .942. Ethnic diversity measures D_1 through D_7 also are strongly correlated. Of the 21 possible correlations for this set of seven indices six are between the absolute values of .672 and .768. The other 15 have absolute values above .922. The number of groups measured by S (D_8) correlates strongly with 1-1/S (D_9). These two measures correlate moderately with measures D_1 through D_7. Among this set of correlations the lowest absolute value occurs between D_9 and D_2. Relative importance, ℓ-1/S (D_{10}), does not correlate strongly with any of the racial diversity measures but does correlate with ethnic diversity measures. Correlations approaching unity occur with D_{10} involving D_1, D_3, D_4, D_5 D_6, D_7, D_{11}, and D_{12}. The absolute value of the correlations of unrelative importance (D_{11}) and equitability (D_{12}) approach unity with all racial diversity measures except D_8, D_9, and D_{10}. Ethnic diversity measures D_{11} and D_{12} approach unity with D_1, D_3, D_4, D_5, D_6, D_7, and D_{10}.

Factor analyses were used to examine these correlations further. A principle components solution with a varimax rotation was conducted using the 14 measures. For racial data the measurements loaded in three factors. These factors accounted for 92.2 percent of the total variance in the data, 70.2 percent by Factor 1, 14.6 percent by Factor 11, and 7.5 percent by

Factor III. Only Coleman's Index E[S], $S(D_8)$, $1-1/S(D_9)$ and $\ell-1/S(D_{10})$ do not load substantially on Factor 1. Coleman's index and E[S] load partially on Factor 1 but more highly on Factor III. The racial diversity indices D_8, D_9, and D_{10} load highly on Factor II.

For ethnic data the measurements loaded only on two factors. Factor 1, being the most significant factor, accounted for 71.2 percent of the total variance in the data. Similar to the race data all variables loaded highly on Factor I, except for Coleman's index, E[S] loaded evenly on both factors but in the same direction as Coleman's index; $S(D_8)$ and $1-1/S(D_9)$ load evenly across both factors.

ANOVA's by sector were completed for each measure of racial and ethnic diversity (Tables 4 and 5). As a measure of racial segregation Coleman's index and $\ell-1/S$ (D_{10}) are not significantly different by sector. All other measures show public schools to be more racially diverse (Table 4). Ethnic diversity doesn't differ significantly between public, private and catholic schools except as measurement by E[S], $S(D_8)$, $1-1/S(D_9)$, and $\ell-1/S(D_{10})$. Means for each sector for each measure are shown in Tables 6 and 7.

Discussion

Coleman's Index of segregation (r_{ij}) using the school as the unit of analysis is a variance measure of the proportion of students in a group within a sector. In this case S_{ij} is not a measure of interacial contact because the number of students in group 1 divide out of the equation. This results in $S_{ij} = P_{kj}$, the proportion of students in group j and school k. Coleman's index measures school deviation from the overall proportion of a group in a sector. Coleman's index (r_{ij}) is not significantly different

between sectors (Tables 4 and 5), therefore white students are distributed within sectors. Because white students are "somewhat" evenly distributed within sectors, the within sector distribution of non-white students would have to vary significantly to arrive at Coleman's conclusion that the within segregation was higher in public schools. Under the above conditions the relationship between Coleman's index (r_{ij}) and E[S] no longer exists. E[S] measures the size of the unit in a sector in terms of the number of students in a school. Although E[S] and r_{ij} don't correlate strongly they are the only measurements that load high on Factor III. Since E[S] is only affected by the number of students in a school Factor III is likely a measure of students (n_i) in a school. If the number of schools are held constant in a sector, only shifts in n_i would affect E[S].

Several measures of diversity are combinations of other measures. These include; D_1, $D_2=1/D_1$, $D_3=PIE=D_5$, $D_4=1-\Sigma\Pi^2$, $D_5=1-D_1$. In addition to these indices, D_6=McIntosh's Index, D_7=Shannon-Weiner Index, D_{11} and D_{12} all load significantly on Factor I for race and ethnic data (Tables 2 and 3). The calculations using these measurements all involve the manipulation of the number of individuals in a group and the total population. Based on correlations and factor loading the concept of diversity is measured by these indices. The measurements involving the number of groups present, $S(D_8)$, $D_9=1-1/S$ and $D_{10}=$[illegible]$- 1/S$ all load strongly on Factor II. This suggests Factor II measures, race and ethnic membership.

The concept of racial and ethnic diversity of schools appear to be best measured by D_1, D_2, D_3, D_4, D_5, D_6, D_7, D_{11} and D_{12}. These indices use evenness, equitability and importance of racial and ethnic characteristics to measure similarity-dissimilarity. Coleman's index is strongly influenced by the proportion of one group. It does not account for the race and ethnic

characteristics of all other groups. Coleman's index is the only index in this study that allows the conclusion that public schools and private schools are equally diverse. All other measures show public schools to be more racially and ethnically diverse. In fact, if the question, what sector allows the highest interacial interaction, then the PIE measure of racial diversity would appropriately best answer that question. The public and Catholic sectors are approximately equal in PIE, with probabilities of .251 and .251 respectively. However, the private sector is significantly less diverse (integrated); the PIE for the private sector is .160. These outcomes are more consonent with the common sense notion that those schools that have the highest proportions of minorities will have the highest degree of diversity.

Further, if social class is considered (see Table 8) public schools enroll far more low income (social status) students than do either the Catholic schools or the private schools. The contrast of public to private schools is 31.72 percent to 6.96 percent in terms of low status students. In light of these findings, Coleman's interpretation of the data together with his measure of so-called "integration" are not just ironic; they are so misleading to be better be described as being tragic.

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Table 1

Correlation Among 14 Measures of Socioethnic Diversity
Ethnicity Correlations Above Main Diagonal, Racial
Correlations Below Main Diagonal (N=1015)

r_{ij}	.086	.228	-.251	-.243	-.248	-.243	-.256	-.293	-.268	-.227	.191	.208	-.208
.086	E[S]	-.158	.105	.160	.126	.160	.191	.071	-.075	-.087	-.248	-.079	.079
-.375	.179	D_1	-.676	-.975	-.971	-.975	-.963	-.922	-.676	-.567	.944	.911	-.911
.385	-.181	-.951	D_2	.672	.672	.678	.768	.761	.615	.393	-.657	-.544	.544
.375	-.179	-1.00	.951	D_3	.996	1.00	.980	.939	.687	.668	-.923	-.888	.888
.374	-.183	-1.00	.950	1.00	D_4	.996	.968	.952	.717	.696	-.904	-.899	.899
.375	-.179	-1.00	.951	1.00	1.00	D_5	.978	.939	.687	.668	-.923	-.888	.888
.383	-.172	-.996	.971	.996	.994	.996	D_6	.942	.681	.590	-.938	-.867	.867
.362	-.185	-.985	.942	.985	.986	.985	.980	D_7	.868	.712	-.832	-.834	.834
.174	-.187	-.656	.659	.656	.659	.656	.637	.754	D_8	.713	-.503	-.572	.572
.153	-.177	-.597	.489	.597	.600	.597	.569	.669	.883	D_9	-.331	-.425	.425
-.223	-.014	.373	-.446	-.373	-.370	-.373	-.401	-.275	.323	.521	D_{10}	.381	-.381
-.370	.174	.956	.898	.956	-.957	-.956	-.950	-.903	-.453	-.448	.500	D_{11}	-1.000
.370	-.174	.956	.898	.956	.957	.956	.950	.903	.453	.448	-.500	-1.000	D_{12}

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r_{ij} = Coleman's Index;

E[S] = The Expected Value of Coleman's Index;

D_1 = Simpson's λ;

D_2 = Simpson Index of Diversity=$1/D_1$;

D_3 = Hurlbert's PIE=D_5;

D_4 = Simpson's $1-\Sigma T^2$;

D_5 = Simpson's $1-\lambda$;

D_6 = McIntosh's Index;

D_7 = Shannon-Weiner Index;

D_8 = S (Number of Groups);

D_9 = 1-1/S;

D_{10} = λ-1/S;

D_{11} = unrelative importance

D_{12} = $1-D_{11}$.

Table 2

Varimax Rotated Factor Matrix for Racial Diversity

Indices	Factor I	Factor II	Factor III
r_{ij}	.39655	-.00707	.69287
E[S]	.21943	-.06304	.85079
D_1	-.98150	-.17912	-.03114
D_2	.95823	.08507	.08177
D_3	.98150	.17911	.93114
D_4	.98092	.18240	.02722
D_5	.98150	.17911	.03114
D_6	.98417	.14956	.03933
D_7	.94748	.29345	.02703
D_8	.52641	.78915	-.03241
D_9	.44751	.88018	-.02865
D_{10}	-.52671	.82756	-.06629
D_{11}	-.97507	.01636	-.02113
D_{12}	.97508	-.01637	.02113

Table 3

Varimax Rotated Factor Matrix for Ethnic Diversity

Indices	Factor I	Factor II
r_{ij}	-.17845	-.49602
E[S]	.30477	-.71969
D_1	-.97228	-.12170
D_2	.70983	.19624
D_3	.97486	.17223
D_4	.96747	.21368
D_5	.97486	.17223
D_6	.97765	.13540
D_7	.91792	.34848
D_8	.64466	.56886
D_9	.54719	.60002
D_{10}	-.95862	.09097
D_{11}	-.91045	-.09480
D_{12}	.91045	.09480

Table 4

Summary of Oneway ANOVA's, Racial Diversity by Sector[1]

Indices	df_b	df_w	SS_A	SS_w	MS_A	MS_w	F
r_{ij}	2	1012	.036	138.810	.018	.137	.134
E[S]	2	1012	13566.00	52185.699	6783.066	51.566	131.539
D_1	2	1012	.315	46.317	.157	.045	3.448
D_2	2	1012	1.949	317.225	.974	.313	3.110
D_3	2	1012	.315	46.316	.517	.045	3.444
D_4	2	1012	.336	44.129	.168	.043	3.859
D_5	2	1012	.315	46.310	.157	.045	3.444
D_6	2	1012	.128	22.720	.064	.022	2.861
D_7	2	1012	.194	23.327	.096	.023	4.196
D_8	2	1012	15.975	1205.002	7.987	1.190	6.708
D_9	2	1012	.328	54.799	.164	.054	3.030
D_{10}	2	1012	.118	41.059	.059	.040	1.460
D_{11}	2	1012	.778	97.714	.389	.096	4.030
D_{12}	2	1012	.778	97.714	.389	.096	4.030

[1]sectors-public schools, catholic schools, private schools

Table 5

Summary of Oneway ANOVA's, Ethnic Diversity by Sector[1]

Indices	df_b	df_w	SS_A	SS_w	MS_A	MS_w	F
r_{ij}	2	1012	.036	138.810	.018	.137	.134
E[S]	2	1012	13566.136	52185.699	6783.06	51.566	131.566
D_1	2	1012	.046	19.506	.023	.019	1.203
D_2	2	1012	18.602	13664.901	9.301	13.502	.689
D_3	2	1012	.007	20.118	.003	.019	.193
D_4	2	1012	.001	19.266	.004	.019	.047
D_5	2	1012	.007	20.118	.003	.019	.193
D_6	2	1012	.038	21.472	.109	.021	.900
D_7	2	1012	.033	36.967	.0168	.036	.461
D_8	2	1012	85.917	9638.228	42.958	9.523	4.511
D_9	2	1012	.058	3.279	.029	.003	8.900
D_{10}	2	1012	.096	12.414	.048	.012	3.946
D_{11}	2	1012	.007	32.810	.003	.032	.114
D_{12}	2	1012	.007	32.810	.003	.032	.114

[1]sectors-public schools, catholic schools, private schools

Table 6

Means of Sectors for Racial Diversity Measures

Indices	Public(N=893)	Catholic(N=84)	Private(N=38)	F
r_{ij}	.019	-.002	.026	.134
E[S]	11.878	.561	.802	131.539**
D_1	.749	.739	.840	3.448*
D_2	1.487	1.521	1.265	3.110*
D_3	.251	.261	.160	3.444*
D_4	.245	.257	.152	3.859*
D_5	.251	.261	.160	3.444*
D_6	.164	.169	.106	2.861
D_7	.192	.210	.126	4.196*
D_8	2.798	3.143	2.395	6.708**
D_9	.563	.609	.499	3.030*
D_{10}	.312	.348	.339	1.460
D_{11}	.692	.698	.839	4.030*
D_{12}	.308	.302	.161	4.030

*p<.05
**p<.01

Table 7

Means of Sectors for Ethnic Diversity Measures

Indices	Public(N=483)	Catholic(N=84)	Private(N=38)	F
r_{ij}	.019	-.002	.026	.134
E[S]	11.878	.561	.802	131.566**
D_1	.214	.222	.181	1.203
D_2	6.342	5.858	6.176	.689
D_3	.786	.777	.792	.193
D_4	.768	.764	.764	.047
D_5	.786	.777	.792	.193
D_6	.629	.611	.647	.900
D_7	.820	.822	.790	.461
D_8	11.222	11.789	9.974	4.511*
D_9	.900	.909	.863	8.900**
D_{10}	.114	.131	.070	3.946*
D_{11}	.251	.247	.238	.114
D_{12}	.749	.753	.762	.114

*p<.05
**p<.01

Table 8

Social Status Distribution by Sector of the Entire High School and Beyond Students
(percent by sector)

Social Status	Public	Catholic	Private
High	9988 20.45	1799 33.53	1194 65.97
Middle	23362 47.83	2540 47.34	490 27.07
Low	15491 31.72	1027 19.14	126 6.96